

**SECTION 01 81 13**

**SUSTAINABLE DESIGN REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Section includes general requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for Project to obtain LEED Silver certification based on LEED-NC, Version 2.2.
  - 1. Other LEED prerequisites and credits needed to obtain LEED certification depend on material selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
  - 2. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification depend on Professional's design and other aspects of Project that are not part of the Work of the Contract.
  - 3. A copy of the LEED Project checklist is attached at the end of this Section for information only.

**1.2 RELATED WORK**

- A. Section 01 00 00 - GENERAL REQUIREMENTS.
- B. Section 01 33 33 - ENVIRONMENTAL SUBMITTALS
- C. Section 01 74 19 - CONSTRUCTION WASTE MANAGEMENT.
- D. Section 01 81 19 - INDOOR AIR QUALITY REQUIREMENT.

**1.3 DEFINITIONS**

- A. U.S. Green Building Council, Leadership in Energy and Environmental Design (LEED) New Construction and Major Renovation, Version 2.2 Reference Guide.
- B. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- C. LEED: Leadership in Energy & Environmental Design.
- D. Rapidly Renewable Materials: Materials made from plants that are typically harvested within a 10-year or shorter cycle. Rapidly

renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.

- E. Regional Materials: Materials that have been extracted, harvested, or recovered, processed, as well as manufactured, within 500 miles (800 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured within 500 miles (800 km) of the project site, then only that percentage (by weight) shall contribute to the regional value.
- F. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
1. "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
  2. "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.
- G. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).
1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.
  2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

#### **1.4 SUBMITTALS**

- A. General: Submit additional LEED submittals required by other Specification Sections.
- B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements,

submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

- C. Project Materials Cost Data: Provide statement indicating total cost for building materials used for Project, excluding mechanical, electrical, and plumbing components, and specialty items such as elevators and equipment. Include statement indicating total cost for wood-based materials used for Project.
- D. LEED Action Plans: Provide preliminary submittals within 14 days of date established for the Notice to Proceed indicating how the following requirements will be met:
1. Credit MR 2.1 and Credit MR 2.2: Waste management plan complying with Division 1 Section "Construction Waste Management and Disposal."
  2. Credit MR 4.1 and Credit MR 4.2: List of proposed materials with recycled content. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
  3. Credit MR 5.1 and Credit MR 5.2: List of proposed regional materials. Identify each regional material, including its source, cost, and the fraction by weight that is considered regional.
  4. Credit MR 7: List of proposed certified wood products. Indicate each product containing certified wood, including its source and cost of certified wood products.
  5. Credit EQ 3.1: Construction indoor-air-quality management plan. Comply with Division 1 Section "Indoor Air Quality Requirement."
- E. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:
1. Credit MR 2.1 and Credit MR 2.2: Waste reduction progress reports complying with Division 1 Section "Construction Waste Management and Disposal."
  2. Credit MR 4.1 and Credit MR 4.2: Recycled content.
  3. Credit MR 5.1 and Credit MR 5.2: Regionally extracted and manufactured materials.
  4. Credit MR 7: Certified wood products.
- F. LEED Documentation Submittals:

1. Credit EA 5: Product data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy-consumption performance over time.
2. Credit MR 2.1 and Credit MR 2.2: Comply with Division 1 Section "Construction Waste Management and Disposal."
3. Credit MR 4.1 and Credit MR 4.2: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
4. Credit MR 5.1 and Credit MR 5.2: Product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
5. Credit MR 7: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.
6. Credit EQ 3.1: Comply with Division 1 Section "Indoor Air Quality Requirement."
7. Credit EQ 3.2:
  - a. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
  - b. Product data for filtration media used during flush-out and during occupancy.
  - c. Report from testing and inspecting agency indicating results of indoor-air-quality testing and documentation showing compliance with indoor-air-quality testing procedures and requirements.
8. Credit EQ 4.1: Product data for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24).
9. Credit EQ 4.2: Product data for paints and coatings used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA Method 24).

10. Credit EQ 4.3: Product data for carpet products indicating VOC content of each product used.

11. Credit EQ 4.4: Product data for products containing composite wood or agrifiber products or wood glues indicating that they do not contain urea-formaldehyde resin.

### **1.5 QUALITY ASSURANCE**

A. LEED Coordinator: Engage an experienced LEED-Accredited Professional to coordinate LEED requirements. LEED coordinator may also serve as waste management coordinator.

## **PART 2 - PRODUCTS**

### **2.1 RECYCLED CONTENT OF MATERIALS**

A. Credit MR 4.1 and Credit MR 4.2: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 20 percent of cost of materials used for Project.

1. Cost of post-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.

2. Cost of post-consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.

3. Do not include mechanical and electrical components in the calculation.

### **2.2 REGIONAL MATERIALS**

A. Credit MR 5.1 and Credit MR 5.2: Provide 20 percent of building materials (by cost) that are regional materials.

### **2.3 CERTIFIED WOOD**

A. Credit MR 7: Provide a minimum of 50 percent (by cost) of wood-based materials that are produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

1. Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:

- a. Rough carpentry.
- b. Miscellaneous carpentry.
- c. Heavy timber construction.
- d. Wood decking.
- e. Metal-plate-connected wood trusses.
- f. Structural glued-laminated timber.
- g. Finish carpentry.
- h. Architectural woodwork.
- i. Wood paneling.
- j. Wood veneer wall covering.
- k. Wood flooring.
- l. Wood lockers.
- m. Wood cabinets.
- n. Furniture.

### **PART 3 - EXECUTION**

#### **3.1 MEASUREMENT AND VERIFICATION**

- A. Credit EA 5: Implement measurement and verification plan consistent with [Option B: Energy Conservation Measure Isolation] [Option D: Calibrated Simulation, Savings Estimation Method 2] in the EVO's "International Performance Measurement and Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction," and as further defined by the following:
- B. If not already in place, install metering equipment to measure energy usage. Monitor, record, and trend log measurements.
- C. Evaluate energy performance and efficiency by comparing actual to predicted performance.
- D. Measurement and verification period shall cover at least one year of postconstruction occupancy.

#### **3.2 CONSTRUCTION WASTE MANAGEMENT**

- A. Credit MR 2.1 and Credit MR 2.2: Comply with Division 01 Section "Construction Waste Management and Disposal."

#### **3.3 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT**

- A. Credit EQ 3.1: Comply with Division 1 Section "Indoor Air Quality Requirement."
- B. Credit EQ 3.2: Comply with one of the following three requirements:
  - 1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a

total volume of 14000 cu. ft. (4 300 000 L) of outdoor air per sq. ft. (sq. m) of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. (1 070 000 L) of outdoor air per sq. ft. (sq. m) of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. (1.52 L/s per sq. m) of outside air or the design minimum outside air rate determined in EQ Prerequisite 1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14000 cu. ft./sq. ft. (4 300 000 L/sq. m) of outside air has been delivered to the space.
3. Air-Quality Testing:
  - a. Conduct baseline indoor-air-quality testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in the USGBC's "LEED-NC: Reference Guide."
  - b. Demonstrate that the contaminant maximum concentrations listed below are not exceeded:
    - 1) Formaldehyde: 50 ppb.
    - 2) Particulates (PM10): 50 micrograms/cu. m.
    - 3) Total Volatile Organic Compounds (TVOC): 500 micrograms/cu. m.
    - 4) 4-Phenylcyclohexene (4-PH): 6.5 micrograms/cu. m.
    - 5) Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
  - c. For each sampling point where the maximum concentration limits are exceeded, conduct additional flush-out with outside air and retest the specific parameter(s) exceeded to indicate the requirements are achieved. Repeat procedure until all requirements have been met. When retesting noncomplying building areas, take samples from same locations as in the first test.
  - d. Air-sample testing shall be conducted as follows:

- 1) All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the duration of the air testing.
- 2) Building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
- 3) Number of sampling locations will vary depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 25,000 sq. ft. (2300 sq. m) or for each contiguous floor area, whichever is larger, and shall include areas with the least ventilation and greatest presumed source strength.
- 4) Air samples shall be collected between 3 and 6 feet (0.9 and 1.8 m) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

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